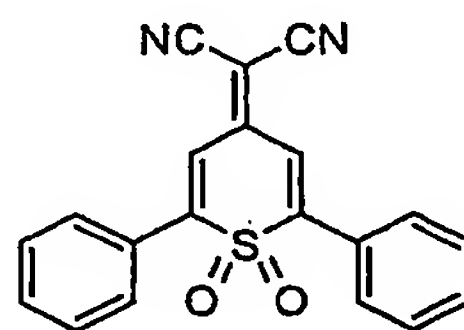
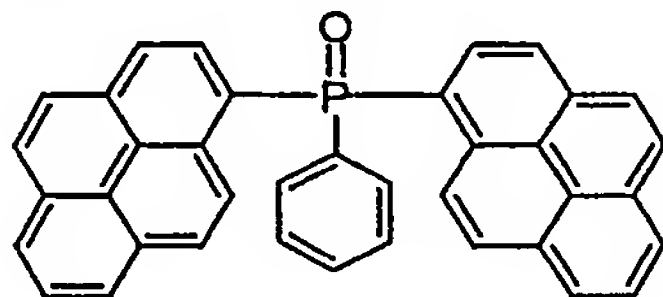
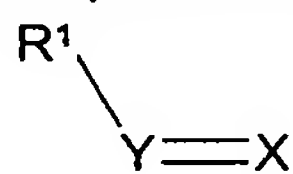


## Patent Claims:

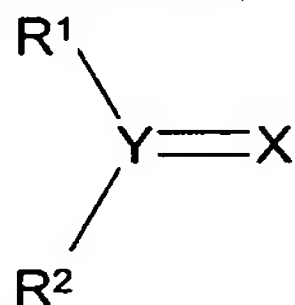
1. Electronic device comprising cathode, anode and at least one organic layer, characterised in that the organic layer comprises at least one defined compound A containing the chemical structural unit  $Y=X$ , where the following applies to the symbols used:
- Y is on each occurrence, identically or differently, P, As, Sb, Bi, S, Se or Te;  
 X is on each occurrence, identically or differently, O, S, Se, Te or NR;  
 R is on each occurrence, identically or differently, an organic radical having 1 to 22 carbon atoms or OH or  $NH_2$ ;
- with the proviso that the compound A has a molecular weight of  $\geq 150$  g/mol and  $\leq 10,000$  g/mol and that the device comprises no phosphorescent emitters; and furthermore with the proviso that the following compounds are excluded from the invention:



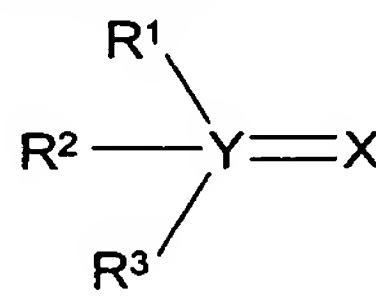
2. Electronic device according to Claim 1, characterised in that it comprises a compound A of the formula (1) to (4) (scheme 1)



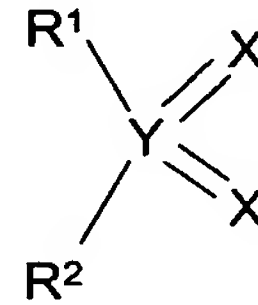
Formula (1)



Formula (2)



Formula (3)



Formula (4)

(Scheme 1)

where the symbols used have the following meaning:

Y is on each occurrence, identically or differently, P, As, Sb or Bi in formulae (1) and (3) and S, Se or Te in formulae (2) and (4);  
 X is on each occurrence, identically or differently,  $NR^4$ , O, S, Se or Te;

$R^1, R^2, R^3$  is on each occurrence, identically or differently,  $N(R^4)_2$ , a straight-chain, branched or cyclic alkyl group having 1 to 40 C atoms, which may be substituted by  $R^5$  or also unsubstituted, where one or more non-adjacent  $-CH_2-$  groups may be replaced by  $-R^6C=CR^6-$ ,  $-C\equiv C-$ ,  $Si(R^6)_2$ ,  $Ge(R^6)_2$ ,  $Sn(R^6)_2$ ,  $C=O$ ,  $C=S$ ,  $C=Se$ ,

$C=NR^6$ ,  $-O-$ ,  $-S-$ ,  $-NR^6-$  or  $-CONR^6-$  and where one or more H atoms may be replaced by F, Cl, Br, I, CN or  $NO_2$ ; a plurality of radicals  $R^1$ ,  $R^2$  and/or  $R^3$  here may with one another form a mono- or polycyclic, aliphatic or aromatic ring system;

or an aromatic or heteroaromatic system having 1 to 40 aromatic C atoms, which may be substituted by one or more radicals  $R^5$ , where a plurality of substituents  $R^1$ ,  $R^2$  and/or  $R^3$  may with one another form a mono- or polycyclic, aliphatic or aromatic ring system,

or an aromatic or heteroaromatic system having 1 to 40 aromatic C atoms which is bonded via a divalent group  $-Z-$ , where one or more H atoms may be replaced by F, Cl, Br or I or which may be substituted by one or more radicals  $R^5$ ; a plurality of substituents  $R^1$ ,  $R^2$  and/or  $R^3$  here may define a further mono- or polycyclic, aliphatic or aromatic ring system;

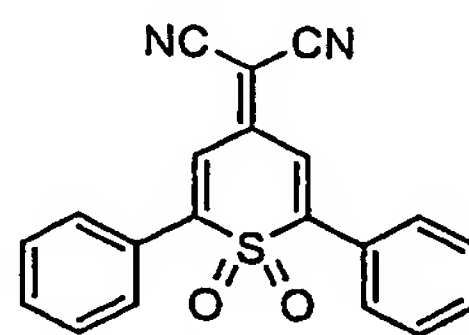
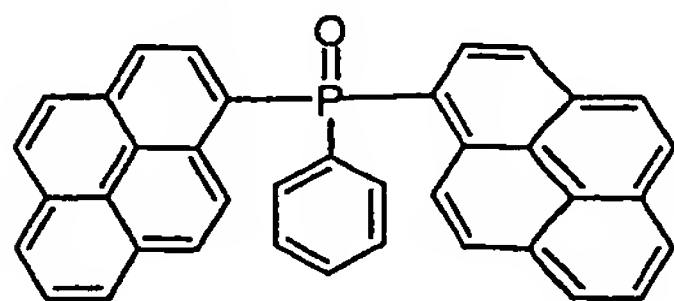
$R^4$  is on each occurrence, identically or differently, a straight-chain, branched or cyclic alkyl or alkoxy chain having 1 to 22 C atoms, in which, in addition, one or more non-adjacent C atoms may be replaced by  $-R^6C=CR^6-$ ,  $-C\equiv C-$ ,  $Si(R^6)_2$ ,  $Ge(R^6)_2$ ,  $Sn(R^6)_2$ ,  $-NR^6-$ ,  $-O-$ ,  $-S-$ ,  $-CO-$ ,  $-CO-O-$ ,  $-O-CO-O-$  and where one or more H atoms may be replaced by fluorine, or is an aryl, heteroaryl or an aryloxy group having 1 to 40 C atoms, which may also be substituted by one or more radicals  $R^6$ , or OH,  $NH_2$ ,  $NH(R^5)$  or  $N(R^5)_2$ ;

$R^5$  is on each occurrence, identically or differently,  $R^4$  or CN,  $B(R^6)_2$  or  $Si(R^6)_3$ ;

$R^6$  is on each occurrence, identically or differently, H or an aliphatic or aromatic hydrocarbon radical having 1 to 20 C atoms;

Z is on each occurrence, identically or differently, a conjugated radical having 1 to 40 C atoms, where one or more C atoms may be substituted by a radical  $R^5$  or halogen;

with the proviso that the molecular weight of the compound A is greater than 150 g/mol and less than 10,000 g/mol; and furthermore with the proviso that the following compounds are excluded from the invention:



3. Electronic device according to Claim 1 and/or 2, characterised in that Y stands for P or S.
- 5 4. Electronic device according to one or more of Claims 1 to 3, characterised in that X stands for O.
- 10 5. Electronic device according to one or more of Claims 2 to 4, characterised in that at least one of the radicals  $R^1$ ,  $R^2$  and/or  $R^3$  stands for an aromatic or heteroaromatic system.
- 15 6. Organic electronic device according to one or more of Claims 1 to 5, characterised in that the compound A contains more than one unit  $Y=X$  or more than one unit of the formulae (1) to (4).
- 20 7. Electronic device according to one or more of Claims 1 to 6, characterised in that the compound of the formulae (1) to (4) does not have a planar structure.
8. Electronic device according to Claim 7, characterised in that at least one of the substituents  $R^1$ ,  $R^2$ ,  $R^3$  and/or  $R^4$  contains at least one  $sp^3$ -hybridised carbon, silicon, germanium and/or nitrogen atom.
- 25 9. Electronic device according to Claim 8, characterised in that at least one of the  $sp^3$ -hybridised atoms is a secondary, tertiary or quaternary atom.
- 30 10. Electronic device according to Claim 9, characterised in that at least one of the  $sp^3$ -hybridised atoms is a quaternary atom.
11. Electronic device according to one or more of Claims 1 to 10, characterised in that a 9,9'-spirobifluorene derivative, a 9,9-disubstituted fluorene derivative, a 6,6- and/or 12,12-di- or tetrasubstituted indenofluorene derivative, a triptycene derivative, a dihydrophenanthrene derivative or a hexaarylbenzene derivative is present in at least one of the radicals  $R^1$  to  $R^4$ .
- 35 12. Electronic device according to Claim 11, characterised in that a 9,9'-spirobifluorene derivative is present in at least one of the radicals  $R^1$  to  $R^4$ .

13. Electronic device according to Claim 7, characterised in that the non-planar radical  $R^1$  or  $R^2$  or  $R^3$  represents a biaryl group.
14. Electronic device according to one or more of Claims 1 to 13, characterised in that the compound of the formulae (1) to (4) is selected from the example structures 1 to 52.
15. Electronic device according to one or more of Claims 1 to 14, characterised in that the compound A is amorphous and the glass transition temperature  $T_g$  of the compound A is greater than 100°C.
16. Electronic device according to one or more of Claims 1 to 15, characterised in that the compound A is employed as electron-transport material.
17. Electronic device according to one or more of Claims 1 to 16, characterised in that the layer comprising compound A consists of at least 50% of this compound.
18. Electronic device according to Claim 17, characterised in that the layer comprising compound A consists only of this compound as pure layer.
19. Electronic devices according to one or more of Claims 1 to 18, characterised in that they are organic electroluminescent devices, organic thin-film transistors, organic field-effect transistors, organic solar cells, organic photoreceptors or organic lasers.
20. Electronic device according to one or more of Claims 1 to 19, characterised in that further layers are present in addition to the layer comprising the compound A.
21. Electronic device according to Claim 20, characterised in that these further layers are selected from hole-injection layer, hole-transport layer, emission layer, hole-blocking layer, electron-transport layer and/or electron-injection layer.
22. Electronic device according to one or more of Claims 1 to 21, characterised in that at least one electron-transport layer comprising at least one compound A is present between the fluorescent emission layer and the cathode.

23. Electronic device according to one or more of Claims 1 to 22, characterised in that the emission layer comprises at least one fluorescent emitter and at least one electron-transport material, where the electron-transport material comprises at least one compound A.

24. Electronic device according to one or more of Claims 1 to 23, characterised in that both an electron-transport layer comprising at least one compound A and an emission layer comprising at least one compound A, which may be identical or different, are present.

25. Electronic device according to one or more of Claims 1 to 24, characterised in that the emission layer comprising the compound A is directly adjacent to the electron-injection layer or the cathode without the use of a separate electron-transport layer.

26. Electronic device according to one or more of Claims 1 to 25, characterised in that the emission layer comprising the compound A is directly adjacent to the hole-injection layer.

27. Electronic device according to one or more of Claims 1 to 26, characterised in that it is an organic electroluminescent device in which the emitter(s) fluoresce(s) in the visible spectral region with one or more maxima between 380 nm and 750 nm on suitable excitation.